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PROGRESS REPORT  
TO  
OFFICE OF NAVAL RESEARCH

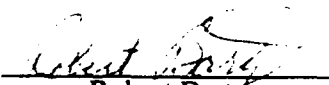
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FOR CONTRACT NO: N00014-90-C-0123

TITLE: Development of an Expendable Particle Sensor

ITEM NO: 0001AB

DATE: 6 May 92

  
Robert Bartz  
Principal Investigator

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## PROGRESS REPORT: Development of an Expendable Particle Sensor

Sea Tech Inc.

Contract No. N00014-90-C-0123

Item No. 0001AB

### INTRODUCTION:

This report addresses progress on the Phase II Development of the Expendable Particle Sensor (EPS) over the time period of October through November 1991. The two major achievements over this time period were: 1.) We incorporated optical feedback into the scattering design using an optocoupler. 2.) We designed a printed circuit board (PCB) which included all the electronics for scattering sensor, the water temperature sensor, and the telemetry transmitter electronics.

### RESULTS:

The development of an optical feedback controlled scattering sensor greatly simplified the expendable particle sensor from a systems point of view. The optical feedback automatically compensates for changes in LED intensity with temperature, greatly reducing the temperature coefficient of the sensor. Thus, there is no need to monitor the probe body temperature to correct the scattering sensor data, and we can use a simpler four-channel telemetry system. The optical feedback circuitry can be seen in Figure 1, the EPS Sensor/Transmitter Circuit.

We designed a printed circuit board which included all the electronics which will go into an expendable particle sensor probe, with the exception of the sea water switch. Figure 1 is a schematic of this circuitry. Figure 2 shows the PCB at its actual size. Although the ultimate size of this board will be reduced through the use of surface mount components and hybrid technology, this board is small enough to fit into Sparton of Canada's expendable probe, and can be used for preliminary field testing.

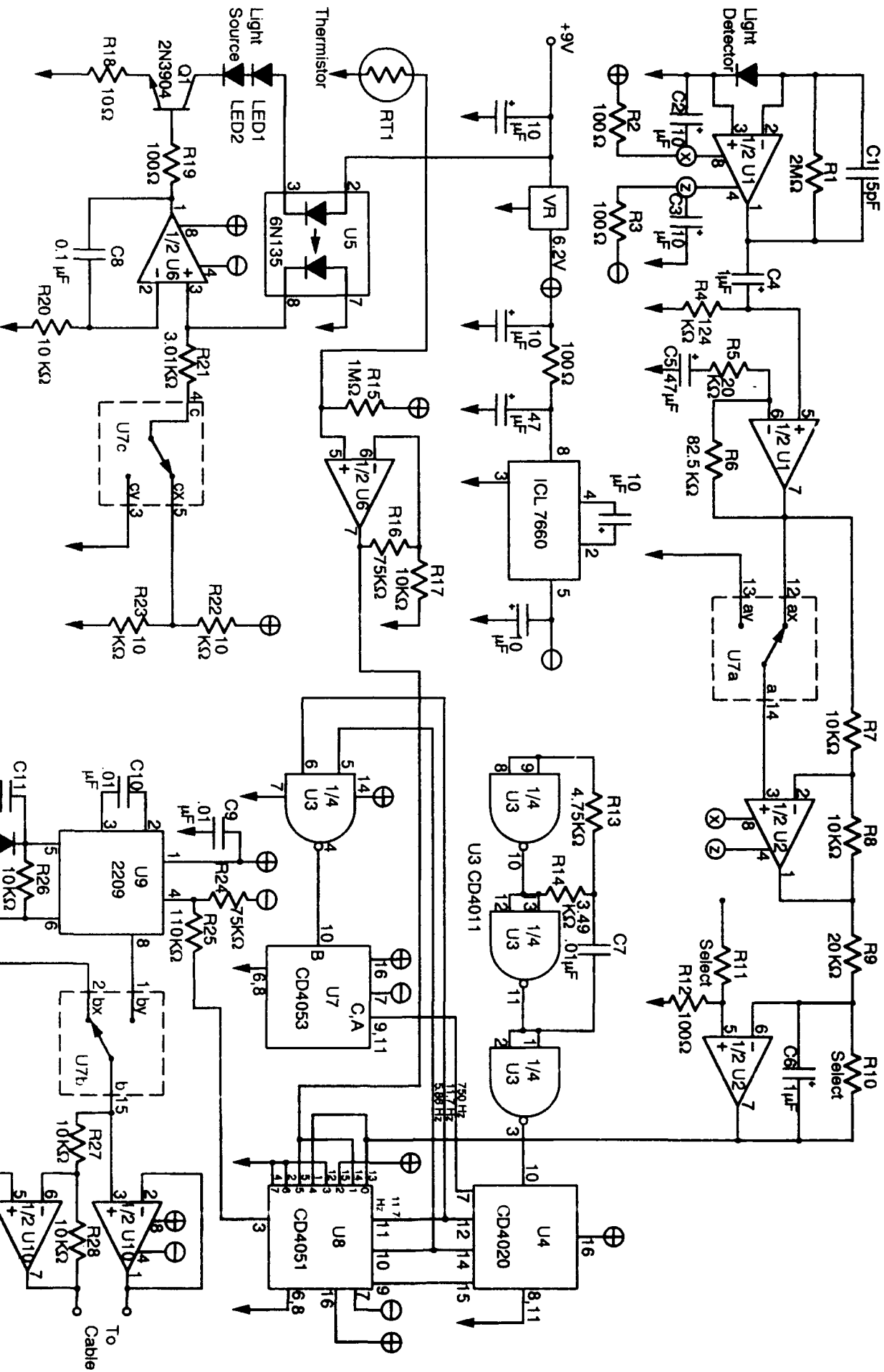


Statement A per Telecon  
Dr. Richard Spinrad ONR/Code 1123  
Arlington, VA 22217-5000

NWW 6/10/92

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**FIC RES 1 and 2**



**Figure 1. Expendable Scattering Meter**

**Sensor and Telemetry Electronics**

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**Jeff Mather**

**Sea Tech Inc.**

**10/22/91**

Notes: Select R11 and connect to  $\oplus$  or  $\ominus$  to zero offset with the light path blocked.  
Select R10 to adjust sensitivity.

We have not yet decided which op amps to use for U1, U2, and U9.

Figure 2 Scattering Sensor Printed Cricuit Board

